



Television and the Obesity Epidemic

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Harvard Prevention Research Center
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Overview

- Evidence for the impact of television viewing on the obesity epidemic
- The impact of TV
 - TV and obesity in children, adults;
 - TV and diet; TV and physical activity
- Strategies for Intervention

Obesity Fundamentals

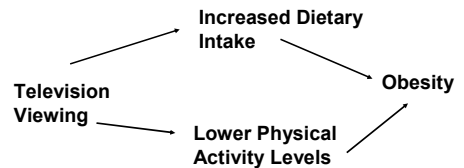
- Obesity is caused by excess Energy Intake over Energy Expenditure
- Daily imbalance is on average small: lots of small seemingly inconsequential acts add up
- Individual behaviors are strongly influenced by their context

Koplan JP, Dietz WH. Caloric imbalance and public health policy. JAMA. 1999;282:1579-81.

Television Viewing and Energy Balance: The Science

- How can television viewing cause obesity?
- Evidence in support of hypothesis

Hypothesized Impact of Television Viewing on Obesity

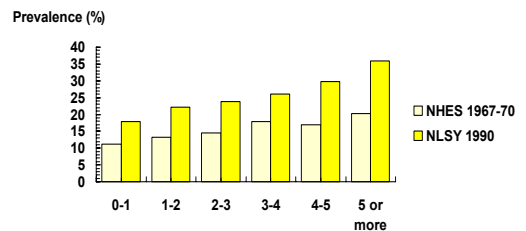


Evidence for the Impact of Television Viewing on Obesity

Population-Based Epidemiological Data

At least: 13 studies in United States
9 studies in other countries

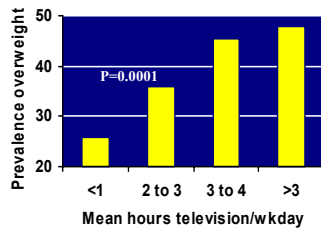
Prevalence of Obesity by Hours of TV per Day; NHES Youth Aged 12-17 in 1967-70 and NLSY Youth Aged 10-15 in 1990



TV Hours Per Day (Youth Report)

Dietz WH, Gortmaker SL. Do we fatten our children at the tv set? Obesity and television viewing in children and adolescents. Pediatrics. 1985; 75:807-812.
Gortmaker SL, Must A, Sobol AM, Peterson K, Colditz GA, Dietz WH. Television viewing as a cause of increasing obesity among children in the United States, 1986-1990. Archives of Pediatrics and Adolescent Medicine. 1996;150:356-362.

Child and Adolescent Television Viewing Predicts Overweight at Age 26



Hancox RJ, Milne BJ, Poulton R. Lancet. 2004 Jul 17;364(9430):257-62.

Randomized Controlled Trials: Television and Obesity

- School-based intervention: primary grades; impact on mean BMI (Robinson. JAMA.1999.)
- Clinical Intervention: Obese children and youth; impact of reducing inactivity on overweight (Epstein et al. Health Psychol. 1995; Arch Pediatr Adolesc Med.2000;154:220-226.)
- School-based intervention; middle school; reduced television predicts reduced obesity among girls (Gortmaker et al. Arch Pediatr Adolesc Med. 1999)

Planet Health



- Steven Gortmaker, PhD PI
- Karen Peterson, RD, ScD Co-PI
- Jean Wiecha, PhD Project Director
- Nan Laird, PhD Co-Investigator

Carter J, Wiecha J, Peterson KE, Gortmaker SL. Planet Health. Champaign, Illinois: Human Kinetics Press, 2001.

Behavioral Targets

- Reduce TV viewing to less than two hours per day
- Decrease consumption of high fat/saturated fat foods
- Increase moderate and vigorous activity
- Increase consumption of fruits and vegetables to five-a-day or more

Effects of Planet Health



- Obesity among females in intervention schools was reduced compared to controls (OR 0.48; P=0.03)
- Reductions in TV; both boys & girls
- Among girls, each hour of TV => reduced obesity (OR 0.86/hour; P=0.02)

Gortmaker SL, Peterson K, Wiecha J, Sobol AM, Dixit S, Fox MK, Laird N. Reducing obesity via a school-based interdisciplinary intervention among youth: *Planet Health*. Archives of Pediatrics and Adolescent Medicine. 1999;153:409-18.

Change in Obesity by Ethnic Group

- Females: evidence for intervention impact by ethnic group
 - Afro-American (OR 0.14; 95% CI 0.04-0.51)
 - White (OR 0.48; 95% CI 0.20-1.13)
 - Hispanic (OR 0.38; 95% CI 0.03-5.3)

Evidence for the Impact of Television Viewing on Mediating Variables - Physical Activity and Energy Intake

Randomized Controlled Trials

RCT of Increase in Sedentary Behavior (mainly TV)

- RCT (N=13) of non-obese youth ages 8-12,
 - Successfully increased sedentary behavior by 80 min/day - later decreased this behavior
 - Observed a subsequent increase of energy intake (250 kcal/day) and decrease in activity (100 kcal/day)
- They found smaller (insignificant) changes when sedentary behavior was reduced

Epstein et al (J of Pediatrics. 2002;140:334-339)

RCT of Decrease in Sedentary Behavior (mainly TV)

- RCT (N=16) of non-obese youth ages 12-16,
 - Successfully increased sedentary behavior by 82 min/day - later decreased by 110 min/day
 - Decrease of sedentary behaviors associated with a decline of energy intake (463 kcal/day) and increase in activity (113 kcal/day)
- Insignificant changes when sedentary behaviors increased

Epstein et al (Am J Clin Nutr. 2005 Feb;81(2):361-6.

Evidence for the Impact of Television Viewing on Mediating Variables - Diet

Population-Based Epidemiological Data

Youth Television Viewing and Diet

- **Positive associations with FOOD choices** (Taras et al, J Dev Beh Peds 1989; Gallo in Frazao, USDA ERS, 1999)
- **Positive associations with total ENERGY intake** McNutt et al. J Adol Health 1997; Coon and Tucker, Minerva Peds 2002)

Television Viewing and Fruit and Vegetable Intake

A Longitudinal Observational Study

- **For each hour increase in television viewing, fruit and vegetable intake decreases -0.14 serving per day (P=0.025)**

Boynton-Jarrett R, Thomas TN, Peterson KE, Wiecha J, Sobol AM, Gortmaker SL.
Pediatrics, 2003 Dec;112(6 Pt 1):1321-6.

Television Viewing and Total Energy Intake

A Longitudinal Observational Study

- For each hour increase in television viewing, total energy intake increases 167 calories per day ($P < 0.0001$)

Wiecha JL, Peterson KE, Ludwig DS, Kim J, Sobol A. When children eat what they watch: impact of television viewing on dietary intake in youth. Archives of Pediatrics and Adolescent Medicine, in press.

Evidence for the Impact of Television Viewing on Mediating Variables - Diet

Randomized Controlled Trials

Borzekowski DL, Robinson TN. J Am Diet Assoc 2001 Jan;101(1):42-6 The 30-second effect: an experiment revealing the impact of television commercials on food preferences of preschoolers.

Planet Health and Reductions in Total Energy Intake



- The Planet Health Intervention resulted in less of an increase in total energy intake in the intervention group (-119 kcal/day) compared to the controls ($P < 0.05$)
- This effect can be explained by reductions in television viewing

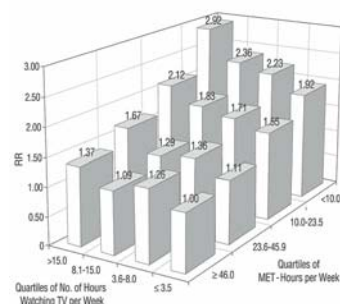
Foods Advertised on Television

- 95% of fast food restaurants ad budget spent on television
- 75% of manufacturer's budgets spent on TV
- Foods most advertised by manufacturers are
 - Confectionary, snacks, prepared convenience foods and soft drinks
- Foods advertised on television budget was \$11b in 1997

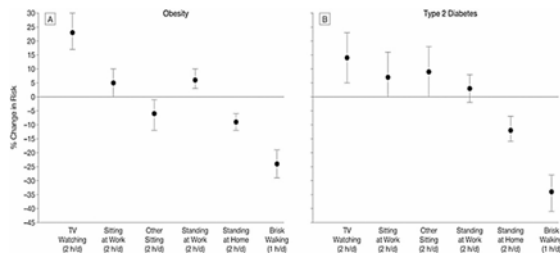
USDA ERS AIB750. 1999

Evidence for the Impact of Television Viewing on Obesity and Diabetes Incidence Among Adults

Population-Based Epidemiological Data



Independent relationship of TV viewing and physical activity to diabetes incidence; males (Hu et al, Arch Intern Med. 2001;161:1542-8)



Independent relationship: TV viewing and other activity to obesity and diabetes incidence; females
(Hu et al, JAMA 2003;289:1785-91)

Evidence for the Impact of Television Viewing on Mediating Variables - Moderate and Vigorous Physical Activity

Observational Studies

TV Watching and Physical Activity

Empirically, there is little relationship between the measured amount of time spent on moderate and vigorous physical activity and the amount of time spent watching television.

Empirical Relationship of Time Spent in Moderate/Vigorous Activity and Time Spent Viewing Television

- Heath et al, 1994. National sample of high school youth.
- Robinson et al, 1993. Sixth and seventh grade students in CA
- Durant et al, 1994. Three and four year old children using observations
- Gortmaker et al, 1991. Adults in university
- Ching et al, 1996. Male Health professionals
- Gortmaker Planet Health
- Hu et al studies 2001; 2003
- No relationship between TV hours & vigorous activity
- Weak inverse association of TV hours and physical activity
- Weak inverse association of TV hours and physical activity
- $R = -0.04$ TV hours and physical activity
- Weak inverse association of TV and physical activity
- $R = -0.04$
- Weak negative; e.g. $R = -0.03$

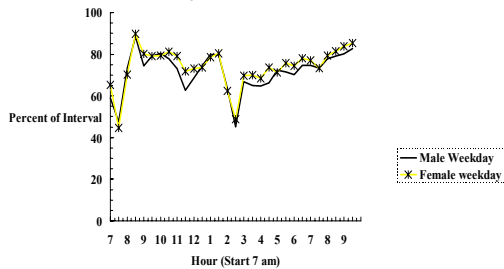
How TV Watching Affects Obesity

- 1) There is much sedentary time to allocate;
- 2) There is very little moderate and vigorous activity time (on average);

Tritrac R3D Activity Monitors

- Monitors provide estimates of movement in 3-planes using minute intervals - signals processed and stored read every minute
- Random sample of 139 7th-8th grade students from 5 schools in Massachusetts
- Wore monitors on waist (like "walkman") for four days each
- Results based on 1,017,421 person/minutes of observation

Figure 1: Percent of Half-Hour Weekday Time Periods With Tritrac Vector Magnitude <250 (~1.5 MET); N=139; 1,017,421 person/minutes



Gortmaker, SL. The role of the physical activity environment in obesity among children and youth in the industrialized world. In: Chunming Chen and William H Dietz (eds). Obesity in childhood and adolescence. Philadelphia PA: Lippincott Williams and Wilkins, 2002.

Time spent at ≤ 1.5 MET during waking hours:

1) Averages 11 hours/day

2) Television viewing about 30% of this time

Conclusion:

There is little or no association of vigorous activity levels and TV viewing time - these should be seen as distinct constructs - not as functional opposites.

Conclusions

- There is clear evidence for television viewing as a cause of obesity - observations and experiments
- There is substantial and growing evidence for the impact of TV viewing on dietary intake
- There is little or no association of vigorous activity levels and TV viewing time - these should be seen as distinct constructs - not as functional opposites

Conclusions

cont.

- But sedentary behavior predicts energy expenditure
- Television viewing and moderate/vigorous activity are both independent risks for obesity and other chronic disease outcomes

Interventions and Policies

- School-based programs to reduce excess television viewing
- After-school programs: creating alternatives to the TV: "least expensive babysitter"
- Community-based programs: creating active alternatives; TV reduction programs

Interventions and Policies

cont.

- Get TV's out of bedroom (now 60% of 6th graders) (Wiecha; Kaiser; Dennison)
- Community safety: more alternatives possible
- Health Care setting: AAP (Pediatrics.1999:104)

Some Good News

- Our interventions indicate it is not hard to change TV viewing levels among children and youth!
- Most of the time they spend viewing TV, youth are not having a good time. Much viewing is alone and not challenging (Csikszentmihalyi, Kubey. Television and the Quality of Life)
- We have a Healthy People target!

Can the Obesity Epidemic Be Halted by Reducing TV Use?

- It's just one cause - so only part of a solution. But right now the best single predictor
- The causes of the epidemic are rooted in the success of the food, television/video/movie/game and advertising industries. These industries are unlikely to change. Why should they when they can make money and continue to increase the size of their market?
- This is going to take a long time

Evaluations

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Your feedback is invaluable to this program.

Thank you!

February 16, 2006

Environmental Health Literacy

Speaker:

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